The partial plane level of terrace and its test

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ABSTRACT

At present, the way to test plane level of terrace are all indirect surrey methods at first, author choose some survey sections and get dates from these sections according to stipulation with survey method and then proceeding the dates, through which can strive the plane level error. The plane level dates Calculated with these dates can't make an overall plane level assessment to the terrace, especially to the partial position so, it can't be describe in detail on all terrace because of not been survived usually. Author all the error and plane level in the partial range the partial plane level, its assessment is very important to control the microcosmic quality.

The paper also discuss the theory issue on speckle method and plane fluctuate capacity method with exist for a long term;

Key words: terrace partial plane level, assessment.

0. INTRODUCTION

Now the detection method of plate flatness are all indirect in and out of the country. It is let light selects definite detection cross section on which according to the specified check point we get the datum and by treating them, the value of flatness is known. Since the method is limited by technical conditions Such as the way of detection and of datum treating, there is some local position (shows as area on large plate)left undetected, then it is impossible to make an elaborate describe about the working site of detected plate.

Usually, local error on the local range of plate and flat of small plate is called local flatness, and detection on which is greatly important on controlling microscopic quality of the plate, so it is absolutely necessary to test the local flatness of plate to make the detection result according to some test point of certain section honestly reflect condition of integrate plate flatness error.

The text described often used method to detect local flatness of plate, items to be cared, and disputing problems long-term existed such as form of detection instrument, how to evaluate the plate quality showed by touched spots and so on.

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1. GRINDING TOUCHED SPOTS OF PLATE AND ITS DETECTION

For scraped cast iron plate, in addition to test its geometry error ,still there is a need to test the colored spots .Doing this has two purpose one is to detect microscopic quality of plate working area ,that is ,to detect height of peak and valley .the other is to prevent plate working area from local distortion in small ranges .when detect the flat of plate working area by existed instrument ,pitch method is the most often used way which detect according to certain sections and definite spans ,so the test spots is limited .In all , colored spots detection must be done.

In JJG117-91 verification code of plate measurement ,it clearly specified the touched spots data of new-made and repaired scraped cast iron plate, and stipulate the data deviation between any two positions should coincident to the Table1.

Table 1

Detection item	precision grade			
	00	0	1	2
Touched spots datum in 25mm*25mmarea	≥25		≥20	≥12
Data deviation between any two square(25mm*25mm)	≤5			

Use the verification instrument which coincident to table 1 and table 3 to make the colored detection.(coating thickness should be 0.002 to 0.004mm)

Table 2

Precision grade	Verification instrument
00	00 grade of plate
0.1	0 grade of plate and flat ruler
1.2	1 grade of plate and flat ruler

Table 3

The specification of detected plate	Verification tools	
	Specification of plate	Flat ruler specification
<400×400	<400×400	>500
>400×400~1000×1000	≥400×400	>500~1500
>1000×1000~1600×1600	≥630×630	>1500~2500
>1600×1600	≥1000×1000	>2500

When verification tools and detected plate touch each other, we can not apply loads along vertical direction. When the verification tools is smaller than plate, the tools must not be dragged away from the working area of detected plate. When sizes of the two is same, the tools can be dragged out but up to one fifth of its own area.

It can not afford accurate error value, so it is difficult to evaluate the plate grade by it, and this method needs a lot of energy. On the other hand, distortion is inevitable. With the development of detection skill, the effect of this method has been reduced. But the method has been used for years and it is beneficiary to keep the plate quality especially to high precision plate, the method is still a kind of important useful detection method at least to the plate which has high accuracy and small size.

2.THE RATIO EVALUATION OF TOUCHED SPOTS TO AREA

When the verification on the data of touched spots create disputes, it is necessary to add the verification of the ratio of touched spots to area and take it as the last evaluation result .the ratio should coincident to the table 4.

Table 4

Verification item	precision grade			
	00	0	1	2
The ratio of touched spots to area on unit area	≥25	≥16%		≥10%
The ratio deviation between any two unit area	≤5%			

Specific ratio of touched spots to area is evaluated by the following way. place a piece of glass plate with the 500mm*500mm area on which engraved 400 small quadrates which area is 2.5*2.5mm,in sequence observe and estimate the fraction of touched spots to area on each quadrate, record the results .the detected plate ratio of touched spots to area is reached by add all fractions and multiply by 1/400.

The reason to refill the additional specification(specific ratio of touched spots to area)is that the stipulation on touched spots data prompt that. needs a lot of time and energy to make the bigger point dispersed, or the spots datum is not qualified. But use for a while, many spots joint together to be an area, which is beneficiary to improve wear resistance .in fact, the most parts of energy spend on precision ground is ineffective. So the detection of touched spots data is displaced by detection of special ratio of touched spots to area in some foreign countries.

3.PLANE FLUCTUATION VALUE OF WORKING AREA

Local flatness error of plate is specified as flatness of straight line in any position and certain length in most countries. The norm of China is SL flatness in 200mm length, and it stipulate to check by using fluctuation instrument showing in fig.1, which was used by English plate norm. Chinese norm is also stipulate: if it is inconvenient to check touched spots such as cast iron plate and stone plate, plane fluctuation value of working area should be detected, the value of it must be up to the specification of table 5.

Table 5

Precision degree	00	0	1	2	3
Fluctuation value of working area	4	8	16	32	80

Verification: place the plane fluctuation instrument on the working area of plate , and drag it along a SL .the dragging distance is one half of the diagonal length of the plate and must larger than 200mm .during the dragging ,read the maximal and minimal value from the dial indicator on the fluctuation instrument .absolute value of the deviation between the two listed value is plane fluctuation value.

This verification result only reflect the action under the dial indicator, and have no data value exchanging relationship with SL flatness error in 200mm and the plane height changes created by three fixed supporting point, so in the table 5 intuitively specify tolerant variance value of the instrument. It is convenient to measure and check the local flatness error of working area by using this method. And the method is required for stone plate. It is very easy for the plate in use to find abrasion condition and scratches on surface by using this detection method , and from this we can conclude if it is necessary to repair.

4. THE FLATNESS OF WORKING AREA IN ANY LOCAL REGION

International norm ISO/DP 8512/~1984 specified the flatness of working area in any local region of plate. 250mm*250mm local area is called local region, and the norm clearly express the detection method of flatness tolerance in any local region of working area is as same as the detection of overall flatness of plate with the area of 250*250mm. Detection by this method, smooth and integrity of the working region appearance should be first searched. Then research and analysis the measurement results of overall flatness error to determine which parts produce sudden and big configuration degree changes. Draw the maximum deviation region then make verification on them, if in that region the flatness is acceptable, then it is certain that local flatness of overall plate is reasonable. The plate which diagonal length is less than 354mm can not have a region with 250mm*250mm area, under this condition, check the overall flatness to express local flatness.

5. CONCLUSIONS

1. Since local flatness of working area of plate is an important parameter to show its surface microscopic quality, it must be detected.
2. To scraper, touched spots data and specific ratio of touched spots to area can be checked. To stone plate, it is necessary to make verification on plane fluctuation value.
3. To plate which is not made by scraping such as ground plate and stone plate, it is recommend to check the plate local flatness by using the detection method of testing flatness of any local region on working area.
4. Since detect local error of plate working area by plane fluctuation instrument has many distinct advantages, it is necessary to take research on the relationship between its detection value and flatness error of SL which length is 200mm also and local flatness error to improve the method applied extensively.